DEPARTMENT OF THE NAVY
BUREAU OF MEDICINE AND SURGERY
WASHINGTON, D.C. 20372

IN REPLY REFER TO
BUMEDINST 6510.6B
BUMED-51
11 May 1977

BUMED INSTRUCTION 6510.6B

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Medical Personnel

Subj: Aviation Pathology Program

Ref: (a) OPNAVINST 3750.6K, Navy aircraft accident, incident and ground accident reporting procedures (NOTAL)
(b) MANMED art. 17-2
(c) NAVREGS, art 0920 (A
(d) BUMEDINST 6510.2D
(e) ~~BUMEDINST~~ NAVMEDCOMINST 5360.1C, Decedent Affairs Manual
(f) NAVMED P-5065, Autopsy Manual (NOTAL)
(g) NAVMED P-5083, Methods for Preparing Pathological Specimens for Storage and Shipment

~~Encl: (1) Triservice directive, Joint Committee on Aviation Pathology, CH-1~~ canceled by NMCINST 6510.2 (Triservice INST) of June 1987.

1. Purpose. To summarize the aviation pathology effort in the Navy and its contribution in support of a joint service program and to include the triservice directive concerning the Joint Committee on Aviation Pathology, enclosure (1).

2. Cancellation. BUMED Instruction 6510.6A is canceled.

3. Background. The Joint Committee on Aviation Pathology was established by a Department of Defense directive of November 1955. This development grew out of the intensive aeromedical investigations of the British "Comet" commercial jet aircraft disasters and focused attention on the need for the complete investigation of human factors in aircraft accidents in conjunction with the exhaustive investigation of material factors. As aircraft performance increases, human factors in flight become increasingly critical. In the event of any failure of the man-machine system, as in an aircraft accident, a complete investigation into the causes, antecedents, and concomitant circumstances of the failure must necessarily include exhaustive studies of the personnel involved. In support of these studies the Armed Forces Institute of Pathology has established an Aerospace Pathology Division and a Toxicology Division within the Department of Forensic Sciences - a joint service endeavor.

a. Reference (a) provides detailed instructions to the Flight Surgeon regarding the preparation of the Medical Officers Report (MOR) (OPNAV Form 3750/8 A thru I (REV. 7-75).

b. References (a) and (b), in conjunction with command prerogatives in Chapter VII of reference (c), direct that when military occupants are fatally injured in military aircraft mishaps, the commanding officer having custody of the remains shall direct post-
R) mortem examinations to be performed. Such autopsies are necessary to determine any correlation between antemortem pathological processes and accident cause factors in the case of pilots and other vital crewmembers, as well as evidence of hypoxia, toxic combustion products, and injuries with their proximate causes in otherwise survivable accidents.

c. Reference (d) contains instructions regarding the manner in which histopathology centers and the Armed Forces Institute of Pathology are to be used in the processing of autopsy material.

d. Reference (e) provides for the recovery, identification and disposition of remains. Chapter 1 of reference (e) sets forth the policies and objectives relating to the program.

4. Discussion. More than half of U.S. Navy major aircraft accidents are attributed to pilot-induced factors, which in part include pathophysiological elements. In addition, failure to successfully escape from a disabled aircraft or to survive after successful egress may be due to these processes. While the overall accident rate has declined, the fatal accident rate has remained relatively constant over the past several years. Concurrently, the cost of aircraft, personnel training, and personal equipment has steadily increased. To bring the loss of lives and dollars to the absolute minimum, it is imperative to investigate thoroughly the human aspect of every aircraft accident in an analytic manner. In a fatal aircraft accident, the investigation cannot be considered complete without an autopsy on each crewmember fatality. Preferably, the autopsy should be performed by a pathologist with training in aviation or forensic pathology.

a. The investigation and evaluation of pathologic and physiologic factors of a fatal aircraft accident include the following: (1) review of medical history and physical exams as noted in health record; (2) detailed review of medical, social, physiological and psychological events; (3) examination of the clothed body, with personal equipment intact, including photographs; (4) radiographs and photographs of unclothed body; (5) gross and microscopic autopsy; (6) special studies of tissues and body fluids; and (7) the analysis of all pertinent evidence and the preparation of the final report.

b. It is a solidly established principle that the aircraft accident site and wreckage should be studied carefully as soon as possible by the pathologist to reveal evidence crucial to the investigation.

c. The purpose of conducting an autopsy in aviation fatalities differs somewhat from the traditional interests of pathologists in (R
seeking to obtain autopsies when death occurs under unnatural or suspicious circumstances, when there is reason to believe that the cause of death might constitute a menace to the public health, or when the cause of death is unknown. In addition to these classical indications for an autopsy, the medical accident investigator is concerned with establishing or ruling out the possibility of pathological processes as causative or contributory factors in every aircraft accident. In conducting such an autopsy on an aircrew fatality the pathologist is, in effect, a member of the accident investigation team. He is interested not only in determining the cause of death, which most commonly in the past has been referred to as "injuries, multiple, extreme", but also in establishing the time and cause relationship between pre-existing disease and the accident, in correlating the injuries with various factors in aircraft and equipment design, and in studying the pathological evidence which might lead to an accurate analysis of the sequence of events surrounding an accident. When viewed in this light, the cause of death is always pending in an aircraft accident until the autopsy has been conducted.

d. The difficulties of obtaining autopsies in some instances are well known to medical officers. It is important that nonmedical personnel be informed of the importance of autopsies and the type of scientific knowledge to be acquired by the procedure. Tact and persuasiveness are important in contacts with civil authorities. The medical officer shall make every effort to assure that the commanding officer and others who are in a position to authorize an autopsy are equally aware of the necessity for the procedure.

e. The autopsy should be conducted by a pathologist, either military or civilian, preferably with experience in the field of aviation (R
pathology, or forensic pathology. It is vital that the flight surgeon be present to assist in the examination and be prepared to guide the inquiry along lines which will provide the maximum of aeromedical information. Circumstances may be encountered where the flight surgeon will be required to perform the autopsy. Reference (f) is an excellent guide in performance of postmortem examinations. If necessary, telephone consultation should be conducted with the Aerospace Pathology Division of the Armed Forces Institute of Pathology. The telephone number during working hours is (202) 576-3232 or AUTOVON 291-3232 and the number after duty hours is (202) 576-2800 or AUTOVON 291-2800. The medical staff of the Naval Safety Center may be consulted at (804) 444-2622 or AUTOVON (A
690-2622. After working hours call (804) 444-3520 or AUTOVON 690-3520.

f. In many fatal aircraft accidents the remains are fragmentary and dispersed. This condition shall not preclude a pathologic investigation.

The Aerospace Pathology Division of the Armed Forces Institute of Pathology has recorded a series of cases in which fragmented remains provided information vital to the accident analyses. Histopathologic and toxicologic examinations are two major means by which important data may be extracted. References (d), (f), and (g) provide instruction in the proper manner of submitting such material to the Armed Forces Institute of Pathology.

g. The analysis shall reflect the sum of significant positive and negative findings obtained from all phases of the investigation; that is, from the accident scene examination, through and including the laboratory studies. The value to the analysis of continuity in the investigation chain cannot be overstressed. The final autopsy report shall be submitted to the appropriate addressees without delay. In no case shall the final autopsy protocol be delivered to the flight
R) surgeon member of the mishap board more than 10 working days after receipt of remains.

5. Action. Addressees are directed to assist in implementing this total program. Every effort shall be made to obtain autopsies on all fatal aircraft accident cases and to insure that aeromedical interests are dealt with in the autopsy protocol. In addition, the final autopsy protocol shall be submitted to the appropriate authorities as outlined in 4g above. The flight surgeon member of the mishap board should be
A) available to assist in conducting the autopsy.

a. Tissue specimens for toxicologic studies should be shipped air freight, (air mail must not be used) addressed as follows:

> Director, Armed Forces Institute of Pathology
> Washington, D.C. 20306
> FRAGILE-RUSH-FROZEN SPECIMENS FOR TOXICOLOGICAL EXAMINATION
> AIRCRAFT ACCIDENT

The Armed Forces Institute of Pathology must be notified by telephone or message of the shipment. The shipper must give the name(s) of the deceased, name of the carrier, flight number, time of arrival, and airport of arrival in the Washington D.C. area (Baltimore-Washington International, National, Dulles, or Andrews AFB). Messages should be addressed "ARMED FORCES INSTITUTE OF PATHOLOGY WASHDC". Although the method of handling these tissues for special studies differs from that used for routine autopsy material, it is emphasized that all such studies constitute a form of autopsy or postmortem examination. If dissection of a body to obtain such specimens is contemplated, reference (b) should be complied with.

b. Proper equipment for collection of specimens should be assembled and ready for use. The following suggestions are made with reference to the submission of specimens in order that best results may be obtained.

(1) In aircraft accident fatalities only, it is permissible to forward representative tissue fixed in sufficient neutral 10 percent formalin, with slides and blocks, directly to the Armed Forces Institute of Pathology for histopathologic study without the routine interposition of histopathology centers. The accompanying autopsy protocol and proper identification of all containers are of utmost importance.

(2) Representative fresh gross autopsy material should be frozen (as quickly as practicable) and forwarded in the frozen state directly to the Armed Forces Institute of Pathology for toxicologic examination. Prompt collection of the fresh tissue is essential and no preservatives such as formalin should be used on these specimens, nor should they be shipped in the same container with tissue preserved by any form of fixation. Various containers for the tissue samples may be used, but polyethylene bags (standard stock item) and rubber bags (condom) are most satisfactory. Whenever possible, it is desirable to obtain 250 to 500 grams of brain, liver, kidney and lung, at least 20 ml of blood, all the stomach contents, and all urine available. For toxicologic studies, in cases of marked soft tissue disintegration, red bone marrow is useful. Muscle may also be of value if it contains sufficient blood. Each tissue specimen should be placed in a separate plastic or rubber bag prior to freezing. Frozen tissues are retained at the Armed Forces Institute of Pathology for 90 days if positive results are obtained, or for 60 days if the results are negative, in the event further toxicologic studies are warranted.

(3) To render valid conclusions from such studies, the Armed Forces Institute of Pathology should be supplied with pertinent data concerning the accident and the autopsy protocol. Samples from a variety of tissues greatly enhance the value of conclusions drawn from postmortem analysis.

c. Procedures set forth herein, on occasion, may tend to delay the return of the remains to the family in accordance with reference (e). It is important that every effort be made to reduce these delays to a minimum.

6. Fees for Civilian Pathologists. When it is necessary to obtain the services of a civilian pathologist, the fees incident thereto are properly payable from funds of the Medical Department as a medical matter. The bills covering these charges should be submitted via the naval activity authorizing the services to the Bureau of Medicine and Surgery (Code 73) for settlement.

W. P ARENTZEN

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